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CURRENT LITERATURE

BOOK REVIEWS

Vegetation in Belgium

One of the most important of ecological investigations is represented by the work of MASSART[1] along the Belgian coast and the neighboring alluvial lowlands. Perhaps no other similar work has been so detailed, and certainly no results of such a study have ever been presented in so sumptuous a form. For a decade and a half MASSART has carefully studied the restricted area here considered, and now there is presented a comprehensive monograph, though modestly entitled an essay. The first chapter deals with the past history of the region from the Miocene on. The modern (Holocene) period was initiated by the withdrawal of the sea and the formation of extensive peat deposits. Later came another invasion of the sea, Roman remains having been found beyond the present shore line. In the ninth century A.D. the Normans began a system of diking, which arrested the incursions of the sea and incited dune formation. At present there are extensive dune areas near the French border and also beyond Ostend and near the Dutch border. The alluvial deposits include chiefly the *polders*, fertile tracts within the dunes lying below sea-level and long ago reclaimed from the sea. Flat depressions among the dunes are known as *pannes* (perhaps to be translated into English as "pans"); an alluvial shore inundated at ordinary high tides is called a *slikke*, while the higher level inundated at the highest tides is called a *schorre*.

The second chapter, dealing with the conditions of plant existence, calls attention to the imperfections of ordinary meteorological data; for example, readings of ordinary air temperatures mean but little and should be replaced by readings of temperatures where the various plant organs, aerial and subterranean, are located; again it is shown how much more important are evaporation data than the more common humidity data. Various southern plants that cannot endure the winter at Brussels are uninjured on the coast. The influence of the winds on tree shape is very marked, and MASSART agrees with those who regard the influence of salt in causing deformity as insignificant when compared with desiccation; the trees most likely to be deformed are the silver poplar, linden, and elm. Very full tables are given, comparing the littoral climate of Belgium with that on other European coasts. By reason of mild temperatures, many plants retain green leaves through the winter, notably winter annuals, biennials, and many evergreen herbs. Other topics here treated are bud protection (RAUNKIAER'S classification being followed), fixation of dunes by vegetation (mosses and lichens being of great importance in this), reactions to the deposit and denudation of sand (e.g., ascent or descent of rhizomes), rigidity of the aerial organs, "adaptations" against desiccation. Consideration is next given to the soil, many analyses being presented, and to the influence of animals and of other plants upon the vegetation. Some attention is devoted to succession, as on the dunes, where Erodium often appears on a fresh surface, giving way later to *Festuca rubra*, and this to Tortula, and this again to various herbs, the succession culminating in a stand of *Salix repens*.

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[1] MASSART, J., Essai de géographie botanique des districts littoraux et alluviaux de la Belgique, avec annexe contenant des listes de plantes, trente-deux planches doubles en phototypie, neuf planches de diagrammes et quatorze cartes. Recueil de l'Institut Botanique LÉO ERRERA 7:167–584+pp. 121. 1908.

BOMMER ET MASSART, Les aspects de la végétation en Belgique; I. MASSART, J., Les districts littoraux et alluviaux. *pls. 86.* Ministère de l'intérieur et de l'agriculture; Jardin botanique de l'état. Brussels. 1908.

The third chapter has to do with the plant associations (the term formation being discarded). An association is defined as "l'ensemble des espèces végétales qui sont adaptées aux mêmes conditions d'existence et qui vivent donc en mélange dans une station, c'est-à-dire dans l'endroit où ces conditions d'existence sont réalisées." After considering the conditions obtaining on the littoral dunes, MASSART takes up the detailed features of the mobile and fixed dunes, the dry and wet "pans," winter pools and permanent pools, cultivated lands and forest plantations. The marine and fluvial alluvia are next considered, attention being given to the tidal belts (*slikke* and *schorre*), ditches, mounds, *polders*, brackish and fresh waters, ponds, canals, dikes, and cultivated areas. Finally there are treated the plants of the Cardium sands.

A chapter is devoted to a floristic comparison between the littoral and alluvial districts and other neighboring districts, Belgium being regarded as divided into two main regions, the domain of the plains and the domain of the hills and mountains. The final chapter deals with the origin of the flora. In the region considered there is not a single endemic species. The dune flora is dominantly "calcicole," thus differing from the dune floras of Holland, Denmark, and Germany. The Cardium sands, on the other hand, are tenanted mainly by "calcifuges."

The *Annexe* is devoted in part to a detailed list of plants, with data arranged in columns showing distribution in Belgium and elsewhere in Europe, and also giving the characteristic vegetative features of the plants considered, a unique and most suggestive kind of tabulation. Most of the *Annexe*, however, is filled with photographic reproductions of the various habitats, diagrams, and maps. The work on "Aspects de la végétation" (following out a plan elaborated by BOMMER in 1903) presents the same or similar photographs in most sumptuous form, the plates having the unusual size of 30×40^{cm}. Doubtless these are the most excellent ecological photographs that have ever been taken, and they are also issued in the most perfect form of any that have yet appeared. Indeed the entire monograph, including the detailed text with its many tables of climatic and edaphic data and vegetative features, as well as the numerous illustrations, may serve as one of the best models now extant for future ecological workers. Many of our

American ecologists who issue several papers a year, giving the results of a few days or weeks of study, may well follow the example of MASSART, who has minutely studied his restricted Belgian littoral in every season for fifteen years and more.—H. C. COWLES.

A new manual of Rocky Mountain botany

To those familiar with the *Manual of the botany of the Rocky Mountain region* which has been the standard field book for that section of the country for practically a quarter of a century, the appearance of a revised edition[2] will appeal with special interest. The territory covered by the present volume remains essentially the same as in the original edition, namely the Rocky Mountain region from Montana and southern Idaho to northern New Mexico and Arizona.

The text in the new edition has been entirely recast; the arrangement of families has been brought into the sequence of ENGLER and PRANTL; the descriptions of the older species in many cases have been rewritten in the light of more complete material and printed in uniform type; the results of taxonomic researches made on the flora of the region during recent years have been incorporated with few exceptions, thus bringing the manual to date; concise and well-contrasting keys have been placed at the beginning of all the larger genera; bibliographical reference is made to the original publication of species and varieties recognized; and limited synonymy is given, particularly wherever a change of name or new combination has been made. These are the salient features which characterize the revised edition.

The circumscription of families continues unchanged; and it is a pleasure to see such natural groups as Leguminosae and Compositae remain intact. The most striking contrast, however, when compared critically with the first edition, is in the matter of generic limitations. Here the reviser has had a difficult task, because of the very great botanical activity in exploration and taxonomic publication in recent years and the tendency toward segregation. Thus the effort to bring together in perfect harmony and to bestow proper value on all genera and species that have been proposed during the past twenty years from the Rocky Mountain region alone has been no light undertaking. And to be absolutely consistent would require essentially a monographic knowledge of every group represented within the limits of the flora. The taxonomist, therefore, may find himself at variance with the treatment of certain groups as delineated in the text. For example, Batrachium, Ranunculus, Halerpestes, Onagra, Anogra, Pachylophus, Lavauxia, Gaurella, Galpinsia, Meriolix, and Taraxia receive equal generic recognition; while other recently segregated groups like Saxifraga, Astragalus, Euphorbia, and Mentzelia have been retained in their broader sense, as they are

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[2] COULTER, JOHN M., New manual of botany of the Central Rocky Mountains (vascular plants), revised by AVEN NELSON. 8vo. pp. 646. New York, Cincinnati, and Chicago: American Book Co. Actual date of publication, December 22, 1909.